

CHAPTER 8

SELECTED FEDERAL REGULATIONS

This chapter describes some federal regulations that may affect the various fabricare alternatives analyzed in this document. Regulatory requirements are an important aspect of comparing alternative fabricare processes because of their effect on daily and long-term costs, equipment requirements, cleaning processes, overhead, owner/operator liability, and business compliance time (Blackler et al., 1995).

Professional clothes cleaners may be affected by the requirements of the following federal air, water, waste management, and occupational health and safety regulations:

(1) Clean Air Act (CAA); (2) Clean Water Act (CWA); (3) Safe Drinking Water Act - Underground Injection Control Regulations (SDWA-UIC); (4) Resource Conservation and Recovery Act (RCRA); (5) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); (6) Occupational Safety and Health (OSH) Act; and (7) the Federal Trade Commission's Care Labeling Rule.

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Following a summary of each of these federal regulations, individual sections discuss how each statute applies to the individual fabricare processes. The final section of the chapter provides examples of state and local regulations, as well as consensus standards of the National Fire Protection Association (NFPA) that apply to the fabricare industry. Exhibit 8-1 summarizes the federal regulations that apply to the various fabricare technologies covered in this Cleaner Technologies Substitutes Assessment (CTSA).

In some cases implementation of federal mandates may be delegated to a state agency. Such programs must be at least as stringent as the applicable federal regulation. However, state and local authorities may impose requirements that are more stringent than those addressed by federal law. There may also be additional state or local requirements that have no federal counterpart.

Owners and operators of drycleaning facilities are encouraged to consult USEPA's *Plain English Guide for Perc Drycleaners: A Step by Step Approach to Understanding Federal Environmental Regulations* [EPA 305-B-96-002 (USEPA, 1996a)] and *Multimedia Inspection Guidance for Drycleaning Facilities* [EPA 305-B-96-001(USEPA, 1996c)] for more detailed discussions of perchloroethylene (PCE) drycleaning regulations.

The discussion in this document is intended for informational purposes only. Stakeholders are encouraged to examine all potentially applicable federal, state, and local regulatory requirements that apply to professional fabricare operations in their jurisdiction. Although spotting agents, fabric finishes, and water softeners are not covered in this regulatory assessment, they should not necessarily be overlooked for their impact on a fabricare operation's regulatory compliance activities.

Exhibit 8-1. Summary of Regulations Related to Fabricare Technologies^a

Fabricare Option	CAA	CWA	RCRA	CERCLA	OSH	Care Labeling Rule	Other
PCE cleaning	✓	✓	✓	✓	✓	✓	NFPA-32
HC cleaning	✓	✓	✓	✓	✓	✓	NFPA-32
Machine Wetcleaning	NA	✓	NA	NA	NA	✓	NA

✓ Indicates that a technology is regulated specifically in statute.

NA Indicates that although the statutes apply to the technology there are no specific regulatory requirements.

^a The list of regulations covered in this chapter should not be considered exhaustive and may not cover all regulated aspects of the fabricare industry.

8.1 CLEAN AIR ACT

The Clean Air Act (CAA) and subsequent amendments are a regulatory framework established to protect and improve ambient air quality in the United States. The CAA was passed in 1970 and amended with significant provisions in 1977 and 1990.

Section 111 established new source performance standards and best achievable technology standards for sources of specific volatile organic chemical compounds (e.g., fabricare establishments). These standards require establishments that emit volatile chemicals to establish and maintain records, make reports, install/use/maintain monitoring equipment, sample locations, and provide this information to applicable regulatory agencies.

Section 112 of the CAA establishes requirements that directly restrict the emission of 189 hazardous air pollutants. USEPA has listed 174 categories of emitters of hazardous air pollutants and developed a schedule for establishing national emissions standards for hazardous air pollutants (NESHAP). These standards require emitters to establish and maintain records, make reports, install/use/maintain emissions controls and monitoring equipment, sample locations, and provide this information to applicable regulatory agencies.

Under Title V, “major sources” of air pollutants may be required to apply for operating permits. Section 112 of the CAA defines major sources as having the potential to emit more than 10 tons per year of any one hazardous air pollutant (e.g., PCE), or more than 25 tons per year of any combination of hazardous air pollutants. Generally, these permits are issued by state programs approved by USEPA. Fabricare operators should contact their appropriate state agency to help them in determining the applicability of “major source” requirements under Title V.

Title VI of the CAA, included in amendments passed in 1990, calls for a phase-out in the production and importation of chlorofluorocarbons (CFCs) in the year 2000 and trichloroethane in 2002 due to their ozone-depleting potential. USEPA originally set up a program to control production and importation of these chemicals through allowances or permits that would be expended in the production and importation of these chemicals. In response to new scientific evidence, USEPA accelerated the phase-

out dates to December 31, 1995. This ban has affected drycleaners using CFCs as their primary solvent and also the type of spotting agents used in all fabricare processes.

8.1.1 Perchloroethylene Cleaning

On September 23, 1993, USEPA promulgated a NESHAP to control PCE emissions from drycleaning facilities (National Perchloroethylene Air Emissions Standards for Dry Cleaning Facilities - 40 CFR Part 63, Subpart M). Compliance with this NESHAP was required by September 1996 for cleaners operating prior to December 9, 1991. Cleaners that began operating on or after December 9, 1991 were required to immediately comply with this regulation. The NESHAP regulations for drycleaners are technology-based, rather than emissions-based. USEPA felt that it would have been prohibitively burdensome to require owners to continuously monitor emissions concentrations and solvent mileage. Therefore, USEPA, as authorized under Section 112(h) of the CAA, passed standards that require installation of certain levels of emissions control equipment combined with mandatory performance testing to ensure that the equipment is functioning properly. NESHAP standards for drycleaners are intended to control emissions of major sources to a level that is represented by maximum achievable control technology. Some area sources (non-major sources) are required in the framework of these regulations to control their emissions to a level that is represented by generally available control technology.

The applicability of NESHAP requirements is dependent on the facility's size category. Exhibit 8-2 presents the air control requirements for drycleaners with new and existing machines based on the volume of PCE purchased and the type of drycleaning machine (USEPA, 1996a). Facilities with coin-operated drycleaning equipment, although mentioned in the NESHAP, are specifically exempted from all NESHAP regulations (40 CFR§63.320(j)). With regard to the three remaining size categories, requirements involving installation of equipment are generally more stringent for larger facilities. The intent is to avoid unduly burdening small businesses with requirements they cannot afford to meet. On the other hand, requirements involving little or no capital investment (e.g., monitoring and recordkeeping) have been standardized for all drycleaners regardless of size.

Requirements for the PCE NESHAP, summarized in Exhibit 8-3, are divided into the following four categories:

- Emissions control equipment requirements (intended to reduce PCE emissions);
- Emissions equipment monitoring (tests to ensure that the control devices are operating properly);
- Fugitive emissions control (prevention of miscellaneous PCE emissions resulting from leaks, improper operation of drycleaning machines, or improper handling of PCE and PCE wastes); and
- Recordkeeping and reporting (demonstration of compliance).

Aside from these requirements, the provisions of this NESHAP prohibit the sale of new transfer machines and require all new machines to be sold with vapor control technology. New transfer machines installed between December 9, 1991, and September 22, 1993, are considered "existing" transfer machines. Existing machines installed before December 9, 1991, are excluded from the equipment requirements in the NESHAP. However, such machines require specific equipment and facility retrofitting if they fall under "large area" and "major source" classifications (40 CFR§63.320). For more specific information, individuals are encouraged to consult the PCE NESHAP directly, or USEPA's *Multimedia Inspection Guidance for Drycleaning Facilities* (USEPA, 1996c).

**Exhibit 8-2. Air Control Requirements for Drycleaners with New and Existing Machines
Based on PCE Purchase Volume^a**

Small Area Source Dry Cleaner	Large Area Source Dry Cleaner	Major Source Drycleaner
Dry-to-dry machines only; PCE use less than 140 gallons/year -or- Transfer machines only; PCE use less than 200 gallons/year -or- Transfer and dry-to-dry machines; PCE use less than 140 gallons/year	Dry-to-dry machines only; PCE use 140 to 2,100 gallons/year -or- Transfer machines only; PCE use 200 to 1,800 gallons/year -or- Transfer and dry-to-dry machines; PCE use 140 to 1,800 gallons/year	Dry-to-dry machines only; PCE use more than 2,100 gallons/year -or- Transfer machines only; PCE use more than 1,800 gallons/year -or- Transfer and dry-to-dry machines; PCE use more than 1,800 gallons/year
Install main PCE vapor recovery system (refrigerated condenser or carbon adsorber) for new machines upon start-up No control equipment required for existing machines Meet good housekeeping, monitoring, recordkeeping, reporting, and leak detection/repair requirements	Install main PCE vapor recovery system (refrigerated condenser or carbon adsorber) for new machines upon start-up Install main PCE vapor recovery system (refrigerated condenser or carbon adsorber) ^b for existing machines by September 23, 1996 Meet good housekeeping, monitoring, recordkeeping, reporting, and leak detection/repair requirements	Same requirements as large area source, plus install additional carbon adsorber for new machines upon start-up and for existing machines by September 23, 1996 Surround all existing transfer machines with room enclosure vented by carbon adsorber by September 23, 1996 Meet good housekeeping, monitoring, recordkeeping, reporting, and leak detection/repair requirements

Source: USEPA, 1996a

^a Usage is based upon the total amount of PCE purchased at facility location for all PCE machines for the previous 12 months.

^b PCE vapor recovery system should be refrigerated condensers or existing carbon adsorbers installed before September 22, 1993.

PCE drycleaners characterized as a major source are required to obtain a Title V operating permit, in addition to meeting the requirements of the PCE NESHAP. USEPA or a designated state agency may be the entity that issues a Title V operating permit in a particular state. Note that any drycleaner defined as a major source is required to obtain a Title V permit. Owner/operators of major source drycleaning facilities are encouraged to contact the applicable state agency to obtain additional information regarding the permit process under Title V.¹ If a drycleaner is not considered a major source (i.e., it is a small or large area source), USEPA recommends that the owner check with the appropriate state air authority to determine if Title V or other air permits are required in the drycleaner's jurisdiction.

Many of the newer PCE drycleaning systems use R-22 (HCFC-22) as a refrigerant in their refrigerated condensers. Although R-22 is a replacement for CFCs, this refrigerant still has ozone-depleting potential. USEPA has established a ban on all production and consumption of R-22 for the year 2020. In the year 2010, production and consumption of R-22 will be banned for all uses except as a chemical feedstock and as a refrigerant in appliances manufactured prior to January 1, 2010. Older machines may still contain the now banned CFC-11 or CFC-12 refrigerants, which have an even higher

¹Under Section 507 of the CAA, USEPA set up a Small Business Assistance Program (SBAP) to assist industries in complying with regulations in every state. Drycleaning operators can contact the SBAP program office in their state to assist them in making a determination of their potential status as a major source under the PCE NESHAP. The SBAP Web site contains a list of state-level contacts for this program (<http://www.epa.gov/ttn/sbap>).

Exhibit 8-3. PCE NESHAP Compliance Requirements for Drycleaners

Requirement	Size Category of Drycleaning Facility		
	Small Area Source	Large Area Source	Major Area Source
Equipment Requirements			
Elimination of all transfer machines classified as new	Required		
Existing transfer machines surrounded with room enclosure vented by carbon adsorber	Not required	Not required	Required
Installation of main PCE vapor recovery system (refrigerated condenser or carbon adsorber) ^a	Required	Required	Required
Installation of additional carbon adsorber for residual PCE recovery system	Not required	Not required	Required
Emissions Equipment Monitoring			
Monitoring of refrigerated condensers	Weekly monitoring required		
Monitoring of carbon adsorbers	Weekly monitoring required		
Fugitive Emissions Control			
Leak detection program	Biweekly inspections	Weekly inspections	Weekly inspections
Simple leak repair	Repair within 24 hours		
Leak repairs requiring ordering parts	Order parts within 2 working days and install parts within 5 days of receipt		
Disposal of cartridge filters	Drain for at least 24 hours		
General operation of drycleaning machines	As per manufacturer specifications and recommendations		
Machine doors kept closed when transferring clothes	Required		
PCE and PCE waste stored in tightly sealed containers	Required		
Reporting			
Initial compliance report	Required upon start-up		
Additional compliance report	Required 30 days after start-up and after any change in facility status ^b		
Recordkeeping			
Facility log book	Maintain on-site for 5 years		

Source: USEPA, 1996c

^a PCE vapor recovery systems should be refrigerated condensers or existing carbon adsorbers installed before September 23, 1996.^b Change in facility status includes changes in ownership or address of the facility, purchase of new equipment, or a change in size category.

ozone-depleting potential and contribute to global warming. As mentioned previously, these chemicals were banned from production and importation on December 31, 1995. If equipment using such chemicals is in need of a recharge, the refrigerant technology must be retrofitted or replaced to accommodate an allowable alternative (Gottlieb et al., 1997).

8.1.2 Hydrocarbon Solvent Cleaning

New source performance standards (NSPSs) for hydrocarbon-based (HC) drycleaners² (40 CFR Part 60 - Subpart JJJ) were promulgated on September 24, 1984. They are applicable in CAA *non-attainment areas*³ for ozone and related photochemical oxidants and may also have been adopted by individual states. The NSPSs set limits on solvent loss from drying, outline standards on the use of filters, and require leaks to be repaired in a timely manner. Drycleaners must add control devices to reduce solvent loss from the washer, dryer, and filters. In addition, they must monitor their machines more closely for leaks (USEPA, 1995).

The following equipment is regulated if it is installed at a facility having a total manufacturer's rated dryer capacity equal to or greater than 84 pounds (38 kg) and constructed after December 14, 1982: (1) HC solvent drycleaners, (2) washers and filters, and (3) stills and settling tanks. The total manufacturer's rated dryer capacity is the sum of the rated capacity for each HC solvent dryer that is in operation or is proposed for operation after a facility modification is finished. A dryer is exempt from these regulations if it was constructed between December 14, 1982, and September 21, 1984, and uses less than 4,700 gallons (17,800 L) of solvent per year.

The following are requirements under the current USEPA NSPS for HC solvent drycleaning operators (KSBEAP, 1997):

- Installation of solvent recovery dryer only.
- Conversion to cartridge-type solvent filters.
- Draining of cartridge-type solvent filters for 8 hours in their sealed housing before removal from equipment.
- Posting of leak inspection and repair notices on all dryers with a clearly visible label. Leak inspection and repair notices also must be recorded in a manual (see 40 CFR§60.622 for recommended label warnings).
- Performance of an initial test to verify that the flow rate of recovered solvent from the solvent recovery dryer at the end of the recovery cycle is no greater than 0.05 L per minute (50 mL/minute).
- Recording of all performance testing as specified in the regulation.

²These new source performance standards specifically regulate drycleaners that use petroleum-based solvents and do not mention the term "hydrocarbon." For the purpose of this analysis, the phrase "hydrocarbon solvent" encompasses three different types of petroleum solvents, two of which were not available to the drycleaning industry when the standards were promulgated in 1984. USEPA encourages stakeholders to refer to the specific regulations (40 CFR Part 60 Subpart JJJ) for a more detailed definition.

³*Non-attainment areas* are geographic areas that do not meet the national ambient air quality standards for one or more of the six criteria air pollutants outlined in the CAA (i.e., sulfur dioxide, nitrogen oxides, particulate matter, lead, carbon monoxide, ozone). Non-attainment areas are designated as such if monitored ambient concentrations of criteria pollutants have exceeded the standard more than the acceptable number of times over a specified period. The time period and number of acceptable exceedences varies among criteria pollutants. Typically, a non-attainment area includes the county(ies) that make up a metropolitan statistical area plus one ring of surrounding counties or communities (USEPA, 1995).

Fabricare operators should note that USEPA is considering the proposal of a NESHAP for HC solvents. Should a proposal proceed, the NESHAP would be expected to require HC solvent drycleaners to use maximum available control technology to reduce emissions from their fabricare operations (KSBEAP, 1997; Szykman, 1998).

8.1.3 Machine Wetcleaning

The chemical detergents and additives analyzed by USEPA for the purposes of this document do not contain ingredients that are regulated under the CAA. However, other wetcleaning products may contain such chemicals. Fabricare operators should always check the ingredient list and material safety data sheet of wetcleaning detergents, additives, and spotting agents to determine the potential applicability of the CAA and other regulations.

8.2 CLEAN WATER ACT

The Clean Water Act (CWA) is the federal law designed to protect the chemical, physical, and biological quality of surface waters in the United States. The original statute of the CWA and subsequent amendments evolved from the Federal Water Pollution Control Act of 1972 (PL 92-500). The CWA regulates both wastewater discharges directly into surface waters via the National Pollutant Discharge Elimination System (NPDES) and discharges into municipal sewer systems. The CWA designates and regulates pollutants in waste water effluent according to the following three categories:

- *Priority Pollutants* - 126 toxic chemicals;
- *Conventional Pollutants* - include biological oxygen demand, total suspended solids, fecal coliform, fats/oils/greases, and pH; and
- *Non-conventional Pollutants* - any pollutant not identified as conventional or priority.

8.2.1 National Pollutant Discharge Elimination System Program

Direct, or point source, discharges of discrete sources of wastewater into a navigable waterbody are regulated under USEPA's NPDES program (CWA§402). This program applies to commercial and industrial facilities, as well as municipal wastewater treatment plants (also known as publicly-owned treatment works, or POTWs). This program requires regulated facilities to apply for an NPDES permit that is issued either by USEPA or an authorized state agency. There are currently 42 USEPA-approved state NPDES programs.

The permits issued under the NPDES program contain industry-specific, technology-based, and water quality-based standards for wastewater effluent. Generally, the standards vary according to the classification of receiving waters. For example, state- and locally-mandated water quality criteria may be designated to protect surface waters for aquatic life and recreation. Such standards may not necessarily account for technological feasibility and/or cost of effluent treatment, more typical of other federal technology-based emissions standards. In addition, NPDES permits specify the pollutant monitoring and reporting requirements for each regulated source of waste water effluent.

There is a small business exemption [40 CFR§122.21 (g)(8)] for all NPDES permit applicants with gross total annual sales averaging less than \$100,000 per year in 1980 dollars (approximately \$146,000 in 1997 dollars).⁴ This exempts small businesses from submitting quantitative data on certain organic toxic pollutants (see 40 CFR 122.21 Table II). However, small businesses must still provide quantitative data for other toxic pollutants (metals and cyanides) and total phenols, as listed in 40 CFR 122.21 Table III. Other small business exemptions may apply to clothes cleaning operations, depending on state and/or regional variances in water quality standards. Regulations concerning other hazardous and non-conventional pollutants are similar for both small and larger facilities.

8.2.2 Wastewater Discharges to Publicly-owned Treatment Works

A facility that diverts its wastewater to a publicly-owned treatment works (POTWs) is not required to obtain an NPDES permit. A national pretreatment program [CWA§307(b)] was established to regulate the indirect discharge of pollutants to POTWs by users. Commercial and industrial customers may be required to comply with regional and local discharge requirements and pretreatment standards. Pretreatment standards include both “categorical” industry standards, implemented on a nationwide basis, and “local limits.” These requirements, which include both narrative and numeric pretreatment standards, are established by the local and regional sewerage authorities to prevent significant interference with the POTW⁵ and to allow POTWs to meet the effluent standards set by their NPDES permits.

Narrative pretreatment standards consist of general and specific prohibitions (40 CFR§403.5), which apply to all discharges made to a POTW. General prohibitions specify that pollutants introduced into POTWs by a non-domestic source (e.g., fabricare operations) shall not pass through the POTW or interfere with the operation or performance of treatment works, create problems with sludge disposal, or cause health and safety problems for plant workers from exposure to chemicals.

The specific prohibitions prevent the discharge of pollutants that cause the following conditions (USEPA, 1996c):

- Fire or explosion hazard (including discharges with a closed-cup flashpoint below 140°F);
- Corrosive structural damage (no pH<5.0);
- Solid or viscous pollutants in amounts that will cause obstruction of flow in the POTW, resulting in interference;
- Any pollutant released in a discharge at a flow rate and/or pollutant concentration causing interference;
- Heat causing inhibition of biological activity and temperature at the treatment plant exceeding 40°C (104°F);
- Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in quantities that will cause pass through and interference;

⁴This estimate is based on conversion using the Apparel and Upkeep Consumer Price Index for urban consumers.

⁵Many POTWs are required, through their NPDES permits, to implement a pretreatment program that provides for control of toxics and compliance with narrative numeric pretreatment standards by its users. A POTW’s authority to implement this program is contained in its local Sewer Use Ordinance (USEPA, 1996c).

- Pollutants that result in the presence of toxic gases, vapors, or fumes in the POTW that may cause acute worker health and safety problems; and
- Trucked or hauled wastes, except at locations designated by the POTW.

Numeric standards consist of categorical standards and local limits. Categorical standards apply to many types of specific industries (e.g., metal finishers), but do not apply specifically to fabricare operators. POTWs required to develop pretreatment programs must develop local limits to implement the general prohibitions listed above. Local limits are site-specific numeric standards, enforceable by the POTW that ensure protection of the treatment works and the receiving water body. Local limits apply to all discharges to the POTW, including those from drycleaners.

One of the reporting requirements that may be applied to a drycleaning facility through a permit is the submission of a report at least once every 6 months regarding the nature, concentration, and flow of pollutants in the wastewater, based on a sampling study and analysis (40 CFR§403.12). Additional reporting requirements that apply to all users of a POTW include (40 CFR§125) (USEPA, 1996c):

- Notification of the POTW, USEPA, and appropriate state agency of any discharge to the POTW that would be considered hazardous if discharged in a different manner. A discharge of more than 15 kg per month of a hazardous waste (e.g., 2.4 gallons of pure PCE) into the sewer would require this type of notification;
- Notification of the POTW in advance of any substantial change in volume or character of pollutants in their discharge, including hazardous wastes; and
- Requirement to submit a notice of discharges, including slug loadings, immediately upon identification of such discharges that could cause problems for the POTW.

Users subject to monitoring requirements must also comply with specific recordkeeping requirements and maintain the records for a minimum of 3 years. Such records include date/place/method/time of sampling and person(s) taking samples, date(s) sample analysis was performed, person performing analysis, analytical technique/method used in analysis, and the results of the analysis (USEPA, 1996c).

As a part of the national pretreatment program, POTWs are required to identify significant industrial users (SIUs), as defined in 40 CFR 403.3. Fabricare operators may be considered significant based on their reasonable potential to adversely affect the POTW or to violate any pretreatment requirements (e.g., through spills or sludge discharges). The regulations further require that POTWs use a control mechanism (i.e., permit) to ensure that all applicable standards and requirements are met by the SIUs (40 CFR§403.8(f)(2)(iii)). Typically, fabricare facilities are not issued permits. However, operators should be aware of the requirements and contact the local POTW to determine the status of their facility. Permits issued by POTWs include effluent limitations, monitoring and reporting requirements, and standard and special conditions.

All professional cleaners, regardless of process option, use several different spot removal products for clothing. Although many biodegradable spotting agents have been developed, a number of the more popular ones (i.e., trichloroethylene, acetone, 2-[2-butoxyethoxy] ethanol) should be disposed of as hazardous wastes, rather than washed down the drain. Wastewater testing performed for the Center for Neighborhood Technology's wetcleaning demonstration project indicates that use of the spotting agent

Picrin™ (100% trichloroethylene) could result in concentrations that exceed USEPA drinking water standards (5 parts per billion, or ppb) (CNT, 1996). Therefore, potentially hazardous spotting agents should be identified and treated appropriately, or eliminated from use.

8.2.3 Perchloroethylene Cleaning

Fabricare facilities using PCE drycleaning technology produce wastewater contaminated with PCE. Possible sources of the wastewater are the use and maintenance of emission control and filtration devices (carbon adsorbers, cartridge stripping cabinets, stills, muck cookers, and refrigerated condensers). PCE-contaminated wastewater is typically called separator water and includes (WEF, 1995):

- Water added to PCE and detergent at the start of the drycleaning cycle;
- Steam used in the desorption step when a carbon adsorber is the primary air pollution control device;
- Water vapor from air that is condensed when a refrigerated condenser is the primary air pollution control device;
- Water used in steam-stripping the cartridge filters;
- Water used in the distillation process; and
- Water used in the vacuum press.

Wastewater is typically gravity-separated prior to discharge. Concentrations of PCE in wastewater vary depending on removal technology (25 to 150 ppm in separator water depending on temperature). Refrigerated condensers produce about 50 gallons of PCE-contaminated wastewater per year, while carbon adsorbers produce up to 1,500 gallons per year depending on the size and type of equipment (Blackler et al., 1995).

If more than 15 kg per month (2.4 gallons) of PCE is discharged into the sewer, operators must notify their local municipal authority, the USEPA Regional Waste Management Division Director, and the state hazardous waste authority in writing. In this case, the notification must include the name of the hazardous waste (PCE), the USEPA hazardous waste number (F002 - still bottom, U210 - unused PCE from machine or storage tanks), and the type of discharge (i.e., batch event or continuous/ongoing spill). If more than 100 kg per month (approximately 16 gallons) is discharged into the sewer, the following must be included in the written notification: hazardous constituents (i.e., additional solvents), an estimate of how much was discharged (in terms of mass and concentration), and an estimate of how much will be discharged during the next 12 months.

To meet the 15 kg threshold, a drycleaner would have to discharge approximately 28,000 gallons of wastewater based on a PCE concentration of 150 ppm. However, if a spill of pure PCE occurred, a release of only 2.4 gallons into the sewer would be needed to meet this threshold level (USEPA, 1996a).

Under section 307(b) of the CWA, a national pretreatment program controls the indirect discharge of pollutants to POTWs by “industrial users.” Therefore, large-scale clothes cleaning facilities may need to meet pretreatment standards for wastewater containing PCE residuals. Technically, PCE-contaminated wastewater at levels greater than 0.7 ppm is considered a hazardous waste under RCRA. However, USEPA has excluded such wastewater from regulation under RCRA if it is discharged directly to a POTW. Unless local POTWs require discharge permits, it is not illegal to dispose of wastewater in this manner. PCE-contaminated wastewater may not be discharged into a septic system according to regulations specified under the SDWA.

8.2.4 Hydrocarbon Solvent Cleaning

Discharge of HC solvents to a POTW may be prohibited under the CWA if their closed-cup flashpoint is less than 140°F and therefore may cause a significant fire or explosion hazard. HC solvents may be classified as “oils” under the CWA (40 CFR§311.1) and the Oil Pollution Act of 1990. Discharge or spills of oils that produce a visible sheen on either surface water, or in waterways and sewers that lead to surface waters, must be reported to the National Response Center at 1-800-424-8802 if they meet reportable quantity criteria. Fabricare operators are encouraged to check the material safety data sheet of a particular HC solvent to determine the applicability of the CWA and other regulations.

8.2.5 Machine Wetcleaning

Machine wetcleaning can result in the discharge of significant amounts of wastewater. The amount of wastewater discharged depends on the fabricare technology used. The content of the wastewater is determined by the soils and the chemical additives used during the cleaning process (i.e., detergents, finishing additives, spotting agents). The contaminants that must be monitored in the evaluation of wastewater will depend on state regulations and local POTW restrictions. The following is a sample of contaminants of concern identified by the Illinois Environmental Protection Agency Bureau of Water and the Illinois Department of Public Health (Tchobanoglous and Burton, 1991; CNT, 1996):

- *Biological Oxygen Demand* - The rate at which organisms use oxygen in the water while stabilizing decomposable organic matter under aerobic conditions. Biological oxygen demand is a measure of the organic strength of wastes in water and the environmental impact of chemical pollution.
- *Suspended Solids* - The nonfilterable residue present upon evaporation of wastewater at 103° to 105°C.
- *Fats, oils, and greases.*
- *Ammonia Nitrogen, Nitrogen, and Phosphorus* - Depending on the receiving stream these components may or may not be desirable.
- *Metals* - The type and level of metals allowed for discharge to municipal treatment systems depends on the treatment systems available to remove them. Standards may be process-specific or applied across an industry.
- *Total Toxic Organics* - There are 126 priority pollutants found in Appendix D of Section 307 of the Clean Water Act (40 CFR 423, Appendix A) for which water quality levels have been developed under the NPDES program.

Analysis of facility wastewater performed in conjunction with two recent wetcleaning studies (Center for Neighborhood Technology; Pollution Prevention Environmental Research Center - University of California at Los Angeles/Occidental College) indicate that such facilities are within POTW wastewater discharge standards (CNT, 1996; Gottlieb et al., 1997). The chemical detergents and additives analyzed by USEPA for the purposes of this document do not contain ingredients that are regulated under the CWA. However, other wetcleaning products may contain constituent chemicals that are regulated under the provisions of the CWA. Fabricare operators should always check the ingredient list and material safety data sheet of wetcleaning detergents, additives, and spotting agents to determine the potential applicability of this and other regulations.

8.3 SAFE DRINKING WATER ACT - UNDERGROUND INJECTION CONTROL REGULATIONS

The Safe Drinking Water Act (SDWA) prohibits the injection of contaminants through wells that will cause a public water supply system to violate a national drinking water standard or otherwise endanger public health or the environment. This statute requires USEPA to set maximum levels for contaminants in water delivered to users of public water systems. Such standards are health-based for drinking water and require water supply system operators to come as close as possible to meeting these standards by using the best available technology that is economically and technologically “feasible.” Primary enforcement responsibility may be delegated to states that request it, if they adopt drinking water regulations no less stringent than the national standards and implement adequate monitoring and enforcement procedures (USEPA, 1996c).

Of special concern are toxic contaminants in water from underground sources. Fabricare operations that use cesspools or septic systems capable of handling the sole sanitary waste of more than 20 people per day, or that use on-site disposal systems for the disposal of industrial waste (different types of Class V injection wells), are subject to federal or state underground injection control regulations (UIC) established under SDWA (USEPA, 1996c).

A Class V injection well is a sub-surface apparatus that meets the definition of an injection well and is used to emplace fluids above or into underground sources of drinking water. USEPA regulates all large household, commercial, and industrial cesspools and septic systems capable of serving more than 20 people no matter what they inject; excluded from USEPA regulation are individual household cesspools and septic systems serving less than 20 people that inject solely sanitary waste. USEPA regulations applicable to Class V injection wells are found in 40 CFR 144 and 146 (Underground Injection Control Program). USEPA Class V guidance documents are currently under development (USEPA, 1996c).

An on-site disposal system typically includes a septic tank and fluid distribution system, or leachfield, which relies on biological organisms and gravity flow to treat and disseminate solely sanitary wastewater. Disposal of even small quantities of industrial wastewater into a septic system is dangerous to the environment in two important ways: (1) industrial waste contains harmful chemicals that undergo minimal change in a septic tank before entering the sub-surface environment and ground water resources; and (2) the industrial waste may also destroy biological organisms in the septic system necessary for sanitary wastewater treatment.

The SDWA prohibits any activity that would “endanger” underground sources of drinking water by contamination. Septic systems discharge wastewater directly underground without any treatment. Industrial waste fluids washed down floor drains into dry wells or cesspools undergo even less change before entering the ground. Chemicals that are denser than water (e.g., PCE) will “sink” below the water table and migrate down through sandy aquifers and fractures in bedrock when released to the ground (USEPA, 1996c).

Violation of the “endangerment” criteria for underground sources of drinking water can result in fines, remediation costs for clean-up, and possible closure of operations and can require permitting procedures. Fabricare operators found in non-compliance may be responsible for penalties up to \$25,000 for each day of non-compliance (USEPA, 1996a).

USEPA directly regulates Class V wells in 15 states,⁶ American Samoa, the Virgin Islands, and the District of Columbia, and for all Indian Tribes. In the other 35 states, Guam, Puerto Rico, and the Commonwealth of the Northern Marianas, drycleaners are subject to applicable state UIC regulations (USEPA, 1996c).

8.3.1 Perchloroethylene Cleaning

In USEPA jurisdictions, all drycleaners who dispose of industrial waste in on-site disposal systems must, at a minimum, submit inventory information to be in compliance with UIC regulations. In addition, drycleaners are required to submit inventory information for cesspools and septic systems that are capable of handling the sole sanitary waste of more than 20 people per day, even if PCE waste or other hazardous chemicals are not disposed of in the system. In all state jurisdictions, drycleaners should contact their applicable state agency to determine minimum compliance requirements (USEPA, 1996c).

A drycleaning facility that disposes of PCE waste and other hazardous chemicals into a Class V injection well is in violation of the SDWA and should close its on-site disposal system immediately. On-site disposal systems that receive PCE waste and hazardous chemicals are associated with many documented cases of groundwater contamination. USEPA considers them high-risk and advises closing all of them. The highest priorities for closure include (USEPA, 1996c):

- Dry wells;
- Cesspools and septic systems that discharge PCE waste and hazardous chemicals into aquifers in Wellhead and Source Water Protection Areas;
- Aquifers that are hydrologically connected to drinking water aquifers;
- Aquifers designated as Sole Source Aquifers; and
- Aquifers that support sensitive ecosystems in estuaries, coastal zones, and watersheds.

USEPA Class V regulations and guidance applicable to drycleaners focus on (USEPA, 1996c):

- Employing pollution prevention methods such as recycling, proper hook-ups to sewers, good housekeeping methods and best management practices, holding tanks and removal off-site, and waste minimization;
- Reporting the location of all on-site disposal systems that receive industrial waste to the applicable state UIC program director;
- Inspecting on-site disposal systems to determine if they are being properly operated and maintained, and if they are being used to dispose of PCE waste or other hazardous chemicals;
- Evaluating the public health and environmental risk of the injection fluid or on-site system based on the site hydrogeological setting of the system;
- Requiring analysis of injected fluids, ambient monitoring, and additional soil or groundwater sampling, as warranted;
- Closing on-site disposal systems that receive PCE waste and other hazardous chemicals or otherwise endanger public health, underground sources of drinking water, or the environment;
- Requiring groundwater remediation, as warranted; and

⁶These states are Alaska, Arizona, California, Colorado, Hawaii, Indiana, Iowa, Kentucky, Michigan, Minnesota, Montana, New York, Pennsylvania, South Dakota, Tennessee, and Virginia (USEPA, 1996c).

- Closing all cesspools.

Cesspools receive and discharge untreated solely sanitary water. All states except Hawaii have recognized the high risk posed by cesspools by, at a minimum, banning the construction of new cesspools (USEPA, 1996c).

8.3.2 Hydrocarbon Solvent Cleaning

The UIC regulations mentioned above for PCE cleaning apply similarly to HC solvents.

8.3.3 Machine Wetcleaning

If an on-site disposal system of a machine wetcleaning operation receives hazardous chemicals (e.g., detergents, spotting agents, and additives), it may be regulated under the provisions of the SDWA-UIC regulations. Local municipalities and states regulate the discharge of wetcleaning waste from a professional cleaner into a septic system. In many states, waste from professional clothes cleaners is considered industrial, and its disposal into a septic system is therefore prohibited (TURI, 1996). The wetcleaning detergent and additive formulations analyzed by USEPA for the purpose of this document are not regulated by the SDWA-UIC regulations. However, other chemical detergents and additives used in wetcleaning equipment may contain ingredients that are regulated by this and other provisions of the SDWA. Fabricare operators are encouraged to check the ingredient list and material safety data sheet of wetcleaning products to determine the applicability of this and other regulations.

8.4 RESOURCE CONSERVATION AND RECOVERY ACT

Passed in 1976, the Resource Conservation and Recovery Act (RCRA) is the primary waste management statute in the United States. RCRA regulates the management and disposal of hazardous (Subtitle C) and solid (Subtitle D) wastes. It establishes a “cradle to grave” system for tracking the production, management, and disposal of hazardous waste. Detailed definitions are provided for both hazardous and solid wastes, as well as specific requirements related to waste generation, management, storage, and disposal. The Hazardous and Solid Waste Amendments of 1984 strengthened RCRA’s waste management provisions and added Subtitle I, governing the management of underground storage tanks.

USEPA has issued regulations implementing the federal RCRA statute (40 CFR Parts 260-299). As of March 1994, 46 states were authorized to implement their own RCRA programs. Non-RCRA-authorized states (Alaska, Hawaii, Iowa, and Wyoming) may have additional or more stringent state laws pertaining to hazardous waste management. Facility operators should always check with their state regulator when determining which requirements apply to their waste management activities.

RCRA sets forth the following requirements for companies that generate sources of hazardous waste:

- Procedures for generators to identify solid and hazardous wastes or wastes exempted from regulation (40 CFR Part 261);
- Standards for obtaining a generator identification number, performing manifesting and other recordkeeping and reporting requirements, ensuring proper labeling and packaging, and waste accumulation units (40 CFR Part 262);
- Land disposal restrictions and treatment standards (40 CFR 268);
- Used oil storage and disposal requirements (40 CFR Part 279);
- Emission standards for volatile organic compounds stored in tanks and containers (40 CFR§264-265, Subpart C); and
- Requirements regarding design and release detection for underground storage tanks, as well as financial responsibility and corrective action standards.

8.4.1 Classification of Hazardous Wastes

USEPA classifies wastes as “hazardous” through regulations (40 CFR Part 261) and lists many wastes according to industrial processes. A waste can be classified as hazardous if it is either listed as a waste or is a characteristic waste. Listed wastes are specifically named in the regulations (e.g., discarded commercial toluene, spent non-halogenated solvents). The different lists of hazardous wastes found in Appendix VII of 40 CFR§261 are as follows:

- F List - wastes from non-specific sources, including wastes generated by industrial processes that may occur in several different industries;
- K List - wastes from specific industry sources;
- P List - acutely hazardous commercial chemical products that have been or are intended to be discarded;
- U List - hazardous commercial chemical products that have been or are intended to be discarded; and
- D List - materials exhibiting a hazardous waste characteristic (ignitability, corrosivity, reactivity, or toxicity).

Characteristic wastes, a subset of listed wastes, are defined as hazardous if they meet the defined criteria for one of four hazardous characteristics (as defined in 40 CFR 261.21-24), which are:

- *Ignitability* - ability to start burning easily; liquids with a flashpoint below 140°F; solids that spontaneously ignite; or oxidizing;
- *Corrosivity* - ability to dissolve metal or burn skin; pH less than or equal to 2.0 or greater than or equal to 12.5;
- *Toxicity* - materials that are poisonous to humans and other living organisms, as determined by the toxicity characteristic leachate procedure⁷; and

⁷The toxicity characteristic leachate procedure is an analytical test that simulates the acidic conditions found in a landfill and determines the amount of a certain regulated substance that would leach from the waste if placed in a landfill. Regulatory levels in parts per million (ppm) are set for 39 hazardous constituents. Any waste exceeding these levels is considered a *toxic hazardous waste*.

- *Reactivity* - ability to undergo rapid or violent chemical reactions, which necessitates special handling requirements.

The waste generator has the responsibility for determining whether a waste is hazardous and what classification, if any, may apply to a waste stream. In addition to laboratory testing, waste generators may use their own knowledge and familiarity with a waste stream to characterize its status under RCRA. They are subject to enforcement penalties for improperly determining that a waste is not hazardous.

8.4.2 Classification of Hazardous Waste Generators

Generator requirements under RCRA are found in 40 CFR Parts 261.5 and 262. A hazardous waste generator is defined as any person, by site, who creates a hazardous waste or a waste subject to RCRA Subtitle C (USEPA, 1995). Generators are divided into the following three categories (USEPA, 1996b):

- *Large Quantity Generators (LQGs)* generate more than 1,000 kg (approximately 2,200 pounds) of hazardous waste per month, or more than 1 kg (2.2 pounds) of acutely hazardous waste per month;
- *Small Quantity Generators (SQGs)* generate between 100 and 1,000 kg (approximately 220 to 2,200 pounds) of hazardous waste per month, or less than 1 kg (2.2 lbs) per month of acutely hazardous waste; and
- *Conditionally Exempt Small Quantity Generators (CESQGs)* generate no more than 100 kg (approximately 220 pounds) of hazardous waste per month or less than 1 kg (2.2 pounds) of acutely hazardous waste per month.

Exhibit 8-4 contains the RCRA requirements for LQGs, SQGs, and CESQGs. CESQGs are required to evaluate the hazardous waste produced by their facility, considering all objects that come in contact with potential waste. In addition, CESQGs must ensure delivery of the hazardous waste to an off-site permitted hazardous waste facility and limit the quantities accumulated on-site to less than 1,000 kg (2,200 pounds). Hazardous waste generators who do not meet the conditions for CESQGs must comply with the recordkeeping and reporting requirements and meet the following requirements (USEPA, 1996b):

- Obtain a generator identification number;
- Store and ship hazardous waste in suitable containers or tanks (for storage only);
- Conduct weekly inspections of hazardous waste storage area(s);
- Properly manifest waste and label containers;
- Maintain copies of the manifest, a shipment log covering all hazardous waste shipments, and testing records;
- Comply with employee training requirements;
- Use only licensed treatment, storage, and disposal facilities;
- Comply with applicable land disposal restriction requirements; and
- Report releases, or threats of releases, of hazardous wastes that may exceed the reportable quantity.

The provisions of 40 CFR§262 provide that SQGs may accumulate up to 6,000 kg of hazardous waste on-site at any one time for up to 180 days without being regulated as a treatment, storage, or disposal facility (TSDF). The provisions of 40 CFR§262.34 (f) allow SQGs to store waste on-site for 270 days without having to apply for TSDF status, provided the waste must be transported over 200 miles.

Exhibit 8-4. RCRA Requirements for Hazardous Waste Generators

Requirement	Category of Hazardous Waste Generator		
	Conditionally Exempt Small Quantity Generator (CESQG)	Small Quantity Generator (SQG)	Large Quantity Generator (LQG)
General Requirements			
Determination of whether waste is hazardous	Required	Required	Required
USEPA I.D. Number	Not federally required	Required	
Personnel training	Not federally required	Employees must be familiar with proper waste handling and emergency procedures	Hazardous waste handling training required for all employees
Contingency planning and emergency procedures	Not federally required	Basic plan required	Full plan required [40 CFR§262.34(a)(4)]
Waste Storage Requirements			
On-site storage quantity limit	≤2,200 lbs (1,000 kg)	≤13,200 lbs (6,000 kg)	No limit
On-site storage time limit ^a	No limit	180 days or ≤200 days if TSDF is over 200 miles away ^b	≤90 days ^b
Satellite accumulation of waste	Not applicable	≤55 gallons	≤55 gallons
Storage maintenance requirements	Not federally required	Basic requirements with technical standards under Part 265 for storage tanks and containers	Full compliance with management tanks, containers, and drip pads
Transporting Requirements			
Packaging, labeling, marking, and placarding requirements	Not federally required	In accordance with applicable DOT regulations	In accordance with applicable DOT regulations
Uniform hazardous waste manifest	Not federally required	Required	Required
Exception reports	Not federally required	Report missing manifest return copy within 60 days of transporter accepting	Contact transporter and TSDF within 35 days of transporter accepting waste to determine status; submit report within 45 days
Type of facility required for off-site management of waste	State-approved solid waste facility or RCRA permitted/interim status hazardous waste facility; check state-specific requirements	RCRA permitted/interim status hazardous waste facility	RCRA permitted/interim status hazardous waste facility
Land disposal notification requirement	Not federally required	Required	Required

Requirement	Category of Hazardous Waste Generator		
	Conditionally Exempt Small Quantity Generator (CESQG)	Small Quantity Generator (SQG)	Large Quantity Generator (LQG)
Recordkeeping Requirements			
Copy of manifests	Not federally required	Maintain copies for 3 years	Maintain copies for 3 years
Copies of biennial report	Not federally required	Not federally required	Maintain copies for 3 years (40 CFR 262.41)
Records of waste analyses	Not federally required	Maintain for 3 years after last shipment of waste	Maintain for 3 years after last shipment of waste

Source: USEPA, 1996c

^a This period precludes a generator from being regulated as a hazardous waste treatment, storage, and disposal facility (TSDF), which is required to adhere to a separate, more stringent set of federal and state regulations (USEPA, 1996c).

^b Storage must occur in tanks or containers only.

LQGs have only a 90-day window to ship wastes off-site without needing a RCRA TSDF permit. Most provisions of 40 CFR 264 and 265 (for hazardous waste TSDFs) do not apply to generators who send their wastes off-site within the applicable window (USEPA, 1996b).

In the case where a fabricare facility produces varying amounts of hazardous waste each month, USEPA has established *episodic generator* status. For example, a facility may be considered an SQG (non-exempt waste) one month and a CESQG (exempt waste) the next month, based on varying levels of hazardous waste production. If an episodic generator mixes waste produced from varying months (e.g., exempt and non-exempt waste), the waste and the facility are held to the most stringent standards of the regulated non-exempt waste (SQG or LQG). However, if the waste is stored and managed separately at the facility, the generator may manage the waste streams separately, according to the applicable standards under which they were produced (56 FR 10153; March 24, 1986).

8.4.3 Underground Storage Tanks

In addition to the provisions regarding hazardous waste management and disposal, RCRA contains requirements regarding the management of underground storage tanks (USTs). A regulated underground storage tank is defined as a tank or combination of tanks and underground connected piping that have at least 10% of their volume underground and which are, were, or may have been used to contain petroleum, hazardous, or other regulated substances (MDEQ, 1996). Facilities that store clothes cleaning chemicals in USTs may be required to protect the tanks from corrosion and equip them with devices to prevent spills and overfills, as well as corrosion protection. The USTs must also have leak detection equipment that provides monitoring data every 30 days (40 CFR§265.190-196) (USEPA, 1995, 1996a).

8.4.4 Perchloroethylene Cleaning

Drycleaners using PCE commonly produce up to seven types of listed hazardous wastes (F002), including (USEPA, 1996a, 1996b, 1996c):

- Spent solvent;
- Still residues from solvent distillation (still bottoms);
- Spent filters and filter media from recovery of used PCE from washers (e.g., cartridge, disk, powder, regenerative, non-regenerative);
- Cooked powder residue or filter muck (associated with powder filters only);⁸
- Button and lint trap wastes, rags and solvent storage containers; and
- Process water (e.g., from a separator).

Occasionally, drycleaners may dispose of unused PCE (including spill residue or materials used to clean spills), which is listed as a hazardous waste (U210). Amounts of these wastes produced depend on the cleaning capacity of the facility and the type of equipment used. Therefore, RCRA management, reporting, and employee training requirements for drycleaning owners/operators will vary, potentially resulting in episodic generator status. Owners/operators of PCE drycleaning facilities are encouraged to consult USEPA's *Plain English Guide for Perc Drycleaners: A Step by Step Approach to Understanding Federal Environmental Regulations* (USEPA, 1996a), USEPA's *Multimedia Inspection Guidance for Drycleaning Facilities* (USEPA, 1996c), or the state regulatory office for additional RCRA-specific requirements and classifications.

The slightly-contaminated wastewater generated from PCE cleaning is considered hazardous waste under RCRA because it was "derived from" an F002 waste. The previously mentioned variance under the CWA precludes regulation of PCE-contaminated wastewater under RCRA as a listed hazardous waste (spent halogenated solvent). Drycleaners are reminded that such discharges to a POTW must comply with the CWA and any local regulations. In addition, typical separator water contains 150 ppm of PCE, which is much higher than the toxicity threshold for PCE-contaminated waste. Separator water may therefore be considered a "toxic" hazardous waste as a result of failing the toxicity characteristic leachate procedure test for this waste stream.⁹

There are two additional disposal options for hazardous separator water produced by a drycleaning operation. USEPA and the drycleaning industry encourage individual businesses to have a licensed waste management company haul and dispose of their PCE-contaminated wastewater for treatment at a properly permitted facility (USEPA, 1995; Ohio EPA, 1996b). It is also acceptable in some states to use an evaporator unit to treat separator water on-site. Although the PCE vapors that result from this treatment method are not considered a hazardous waste, individual states may have specific emissions control

⁸Cooked powder residues are a by-product of PCE cleaning processes that use diatomaceous earth (clay) powder filters to remove oil and grease from the solvent. This potentially hazardous waste product is not associated with PCE cleaning processes that use carbon cartridge and fabric disk filters.

⁹In some instances, a material is considered hazardous based on two or more criteria in RCRA. For example, PCE separator water is considered a hazardous waste by default under RCRA's "Derived From" rule, because it is derived from an F002 waste. In addition, separator water typically contains about 150 ppm of PCE. Since this level exceeds the TCLP level of 0.7 ppm for PCE contaminated waste, the separator water meets the RCRA toxicity criteria for a characteristic hazardous waste (Blackler et al., 1995; USEPA, 1995).

standards for evaporator equipment used in this manner (IDEM, 1995; Ohio EPA, 1996a). Drycleaners are encouraged to contact their applicable state regulatory agency to determine the most appropriate disposal method for their jurisdiction.

Land disposal restrictions have been established for chemicals regulated under RCRA, prohibiting the disposal of waste containing more than 1% (10,000 ppm) of halogenated solvents (40 CFR Part 268). Since wastewater typically contains 150 ppm of PCE, the federal land disposal restrictions provision is not likely to apply to this waste source (USEPA, 1995). However, there may be state regulations affecting drycleaning operators that supersede this federal exemption.

Drycleaning facilities that store PCE in USTs are subject to USEPA and state UST regulations. These require that a tank be protected from corrosion, equipped with devices that prevent spills and overfills, and monitored for leaks every 30 days (40 CFR§265.190-196) (USEPA, 1995, 1996a).

8.4.5 Hydrocarbon Solvent Cleaning

Waste materials contaminated with HC solvents may be considered characteristic hazardous waste under RCRA if the flashpoint is less than 140°F (ignitable). Fabricare operators who use these types of HC solvents will have to comply with hazardous waste generator requirements under RCRA. Many of the newer HC solvents and associated cleaning technologies have been developed with a flashpoint equal to or greater than 140°F specifically to avoid classification as ignitable.

Sources of waste contaminated with HC solvents are similar to those found in PCE drycleaning operations and may include (USEPA, 1996a, 1996b, 1996c):

- Spent HC solvent;
- Still residues from solvent distillation (still bottoms);
- Process water (e.g., from a separator);
- Spent filters and filter media from recovery of used HC from washers (e.g., carbon cartridge, fabric disk, diatomaceous earth powder-coated, regenerative, non-regenerative);
- Cooked powder residue (associated with powder filters only);
- Button and lint trap wastes; and
- Rags and solvent storage containers.

Drycleaning facilities that store HC solvent in underground storage tanks are subject to USEPA and state UST regulations. These require that a tank be protected from corrosion, equipped with devices that prevent spills and overfills, and monitored for leaks every 30 days (40 CFR§265.190-196) (USEPA, 1995, 1996a).

8.4.6 Machine Wetcleaning

The chemical detergents and additives analyzed by USEPA for the purposes of this document do not contain chemicals regulated under RCRA. However, other wetcleaning product formulations may contain ingredients that are regulated under RCRA. Fabricare operators are encouraged to check the ingredient list and/or material safety data sheet of wetcleaning detergents and additives to be sure that this and other regulations do not apply.

8.5 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), known more commonly as Superfund, is the federal statute that establishes a variety of mechanisms to clean up sites contaminated with improperly disposed chemical wastes. This 1980 statute authorizes USEPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables USEPA to force responsible parties to clean up environmental contamination or reimburse USEPA's Superfund for emergency response costs. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extending the taxing authority for the Superfund and creating an additional free-standing federal law (SARA Title III - Emergency Planning and Community Right to Know Act).

Under CERCLA, potentially responsible parties (PRPs) that contribute to chemical contamination on a particular site, regardless of the extent or intent of their involvement, are held strictly liable. Such liability is retroactive; that is, PRPs can be identified for a contaminated site many years after the actual event has occurred, regardless of the legality of the management and disposal practices at the time of disposal. Current and past land owners, as well as fabricare shop owners, may be held liable if any type of contamination is found on a site. Even if concentrations of chemicals in wastewater are within limits set by a POTW, there is a possibility that individual shops can be held liable in the future if a sewer line leaks contaminated wastewater.

CERCLA regulations apply to any release of a *hazardous substance* on a site, as defined in the following manner:

- Substances designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act;
- Elements, compounds, mixtures, solutions, or substances designated pursuant to Section 102 of CERCLA;
- Hazardous wastes having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (excludes any waste whose regulation under the SWDA has been suspended by Act of Congress);
- Toxic pollutants listed under Section 307(a) of the Federal Water Pollution Control Act;
- Hazardous air pollutants listed under Section 112 of the CAA; and
- Imminently hazardous chemical substance or mixture with respect to which the USEPA Administrator has taken action pursuant to Section 7 of the Toxic Substances Control Act.

Petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a *hazardous substance*, is exempted from regulation under CERCLA. This exemption includes natural gas, natural gas liquids, liquefied natural gas, synthetic gas usable for fuel, and mixtures of natural and synthetic gases.

Hazardous substance release reporting regulations under CERCLA (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center any environmental release of a hazardous substance that exceeds a “reportable quantity.” Reportable quantities are defined and listed in 40 CFR 302.4. Generally, a release report triggers a response by USEPA or by one or more federal or state emergency response authorities (USEPA, 1995).

USEPA implements hazardous substance responses according to procedures outlined in the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) (40 CFR Part 300). The NCP includes provisions for permanent clean-ups, known as “remedial actions,” and other clean-ups, referred to as “removals.” USEPA generally takes remedial actions only at sites on the National Priorities List, which currently includes 1,300 sites. Both USEPA and states can act at other sites; however, USEPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process (USEPA, 1996a).

8.5.1 Perchloroethylene Cleaning

The presence of PCE in the separator water of drycleaning operations is a potential liability concern for professional clothes cleaning operations. The traditional discharge of this water directly into municipal sewer systems, a practice that the drycleaning industry now discourages, may be responsible for contamination of groundwater in some areas. Accidental spills and leaks of PCE on cement floors are reported to have caused some soil and groundwater contamination at these sites (Blackler et al., 1995). Leakage of underground storage tanks containing PCE is another potential source of contamination at these sites (USEPA, 1995).

Many sites with past and present PCE drycleaning operations are already contaminated to levels that will limit future uses of the property. Indeed, many property owners will not lease space to clothes cleaners who use PCE and other solvents in their operations. CERCLA allows USEPA to hold land owners and drycleaning operators jointly and severally liable for PCE contamination. The industry is working with Congress to incorporate provisions in the reauthorization legislation for CERCLA that address the clean-up of PCE-contaminated drycleaning operations (Blackler et al., 1995).

The effluent water of drycleaning operations can contain as much as 150 ppm of PCE and can contribute 0.3 to 6 pounds per year of PCE loss depending on the equipment (WEF, 1995). Although this dilute waste stream is discharged directly to a municipal sewer system, pipe leakage of wastewater from this potentially persistent source can result in contamination of soils and ground water (Blackler et al., 1995). Installation of a refrigerated condenser, in addition to a carbon adsorber, can reduce the amount of wastewater by 30 times. Even so, the industry now recommends that all wastewater be disposed of through properly licensed RCRA waste hauling and disposal companies (USEPA, 1995, 1996a).

Since passage of CERCLA, court rulings have repeatedly established the liability of property owners in Superfund actions. Therefore, financial lending institutions and realtors have developed specific procedures to reduce their liability if they are associated with drycleaning facilities. These procedures include requirements for site inspections, soil and groundwater monitoring, and survey and sampling work, all often at the cost of the drycleaner. Leasing restrictions and loan withdrawal mechanisms have become a part of real estate and lending transactions to drycleaners (Gottlieb et al., 1997).

The potential financial liability that CERCLA places on drycleaners and their property owners has promoted protective legislation in eight states. This legislation may include funding mechanisms to assist drycleaners in reducing their liability exposure, drycleaner registration fees, per-gallon surcharges on PCE purchases, mandatory liability insurance, and/or a gross receipts tax.¹⁰ Additional information regarding this topic is presented in Section 8.8 (Other Applicable Regulations) (Gottlieb et al., 1997).

8.5.2 Hydrocarbon Solvent Cleaning

Fabricare operations that result in the contamination of a site with HC solvents may result in CERCLA liability, in a manner similar to sites contaminated with PCE solvent. Many HC solvents can be characterized as a hazardous substance under CERCLA, because they are considered ignitable (listed) hazardous wastes under RCRA (flashpoint less than 140°F). However, the petroleum exemption and the nature of HC solvent mixtures necessitates making the following determination:

- Mixtures of petroleum distillate fractions that are modified beyond the refining process (i.e., chemicals considered hazardous substances are added to the mixture) are considered hazardous substances.
- Mixtures of petroleum distillate fractions that contain hazardous substances, but are not modified beyond the refining process, are not considered hazardous substances under CERCLA's petroleum product exemption.

Therefore, the chemical composition and the manner in which HC solvent products are produced will determine if CERCLA liability applies to specific substances. Also, some of the newer solvents, such as 140°F solvent and DF-2000, may not be considered ignitable (hazardous) due to their higher flashpoints. Fabricare operators are encouraged to carefully read the ingredient list and material safety data sheet of petroleum solvent products to assist them in making a determination in this regard (USEPA, 1987). Even if CERCLA does not apply to a particular HC solvent product, fabricare operators should check with an appropriate state agency to determine if future liability can result under a state statute.

8.5.3 Machine Wetcleaning

Contamination of a wetcleaning site may occur as a result of leaky wastewater pipes and accidental spills. Analyses performed in conjunction with two recent studies (Center for Neighborhood Technology; Pollution Prevention Environmental Research Center - University of California at Los Angeles/Occidental College) indicate that a site contaminated with wetcleaning wastewater has the potential to result in CERCLA liability. Constituents of concern identified in the wastewater effluent of

¹⁰Legislation has been enacted in Connecticut, Florida, Kansas, Minnesota, Oregon, South Carolina, and Tennessee, with legislation pending in Illinois, New Jersey, North Carolina, and Pennsylvania (Gottlieb et al., 1997).

wetcleaning operations include heavy metals, phthalate, acids, acetone, diethylene monobutyl ether, and various organic spotting chemicals (PCE and trichloroethylene) (CNT, 1996; Gottlieb et al., 1997).

The wetcleaning detergent and additive formulations analyzed by USEPA for the purposes of this document did not contain chemicals that are regulated under CERCLA. However, fabricare operators are encouraged to check the ingredient list and material safety data sheet of all wetcleaning products to determine the potential applicability of this and other regulations.

8.6 OCCUPATIONAL SAFETY AND HEALTH ACT

The Occupational Safety and Health Administration (OSHA) was established in 1970 under the U.S. Department of Labor to reduce occupational fatalities, injuries, and illnesses and to develop health and safety standards and training programs for the protection of workers in the United States.

Section 6 (a) of the Occupational Safety and Health (OSH) Act enabled OSHA to promulgate existing federal and national consensus standards as OSHA standards. Under authority of this provision, the Health Standards program of OSHA established the following exposure limits for general industry air contaminants (29 CFR 1910.1000 Subpart Z):

- *Permissible Exposure Limit-Time-Weighted Average (PEL-TWA)* - an 8-hour average exposure that workers should not exceed. A PEL-TWA assumes a 40-hour work week, 50-week work year, and 45 years of work.
- *Short Term Exposure Limit (STEL)* - a 15-minute, TWA exposure that shall not be exceeded at any time during a workday unless another time limit is specified for the contaminant.
- *Ceiling Limits* - exposure levels that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling limit shall be assessed as a 15-minute average exposure that shall not be exceeded during any part of the workday.

Most PELs were adopted from the Walsh-Healey Public Contracts Act, which adopted standards from the 1968 Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. On June 7, 1988, OSHA proposed to revise the PELs by adding 164 substances to the list and lowering the PEL for 212 of the 600 substances listed. OSHA also wanted to establish skin designations, STELs, and ceiling limits for some of these substances. In 1994 the 11th Circuit Court of Appeals vacated the standard. OSHA currently only enforces the earlier PELs for the substances in the original Z tables. OSHA can rely on the "general duty clause," Section 5(a)(1) of the OSH Act, if it considers exposure to any air-borne substance to be too high. Under Section 5(a)(1) citations, the burden is on OSHA to show what is technologically and economically feasible for the cited employer. The 1994 court ruling prompted OSHA to begin developing individual PELs, STELs, and ceiling limits for the substances included in the Health Standards program (USEPA, 1996b).

In addition to chemical exposure standards, OSHA has established exposure standards for a number of relevant physical hazards found in occupational environments (e.g., non-ionizing radiation - 29 CFR 1910.97, occupational noise exposure - 29 CFR 1910.95). OSHA standards also cover the following workplace health and safety issues:

- Employee hazard communication (employee-right-to-know) and required signage;
- Recordkeeping associated with workplace injuries and illness;
- Employee personal protective equipment;
- First aid, blood-borne infectious diseases, workplace sanitation, and emergency response guidelines;
- Machine guarding, fire safety, electrical safety, and lockout/tagout standards; and
- Employee training.

These and other occupational health and safety issues are discussed in detail in the State of Michigan's *Regulatory Guide for the Michigan Fabricare Industry* (MDEQ, 1996). Fabricare operators are also encouraged to contact OSHA and their state occupational health and safety department to determine which regulations pertain to their operation and jurisdiction.

8.6.1 Perchloroethylene Cleaning

The PEL for PCE is 100 ppm; however, when OSHA promulgated its PELs in 1989, the state-plan states also adopted them. Since these standards were not vacated by court decision, some states may still enforce the 25 ppm 8-hour TWA. Many drycleaners voluntarily have taken measures to meet the 25 ppm PEL in their facilities by installing control devices, such as carbon adsorbers or refrigerated condensers, and implementing work practice controls (Blackler et al., 1995). Today, OSHA recommends that drycleaners limit occupational exposures of PCE to 25 ppm, but can only enforce 100 ppm. In addition to the PEL-TWAs, there is a ceiling limit of 200 ppm (5-minute average in any 3 hours) and a 300 ppm maximum peak never to be exceeded during the workday. OSHA is currently undertaking a review of the PEL for PCE in the drycleaning industry (Gottlieb et al., 1997).

8.6.2 Hydrocarbon Solvent Cleaning

Some regulatory and recommended limits have been determined for Stoddard solvent, a specific type of HC solvent. In January 1989, OSHA adopted a 100 ppm PEL-TWA to replace the pre-1989 PEL. However, the pre-1989 PEL for Stoddard solvent of 580 ppm TWA is in effect because all new 1989 PELs were vacated via court decision. Some states may still maintain the 1989 PEL, however.

8.6.3 Machine Wetcleaning

Acetic acid, which is an additive to the water used in wetcleaning, has a 10 ppm PEL-TWA established by OSHA. A dilute mixture of acetic acid and water forms the equivalent of household vinegar.

8.7 CARE LABELING RULE

The Care Labeling Rule (16 CFR 423) was promulgated by the Federal Trade Commission (FTC) in order to establish uniform care instructions for textile garments and accessories. This rule requires clothing manufacturers to label garments with an acceptable cleaning method, supported by a "reasonable basis." The reasonable basis for labeling a garment with a particular cleaning method can be based either upon the historical success with a particular cleaning technology or actual test results that consider fiber, fabric, and garment construction variables (Riggs, 1998).

There is some controversy over the effectiveness and usefulness of this rule in promoting drycleaning versus alternative cleaning methods. A garment often can be cleaned effectively by either dry, wet, or other cleaning methods. In order to avoid confusion and ambiguity, as well as potential liability associated with damaged clothing, clothing manufacturers may label a garment with a “dryclean only” label (Blackler et al., 1995). Researchers call this practice “low labeling,” in which manufacturers tend to indicate very cautious care instructions, in an effort to avoid liability for damaged merchandise (Riggs, 1998).

Professional clothes cleaners are not legally bound to clean garments in the manner specified by the manufacturer. However, they are legally responsible for any damage to a customer’s garment if it is not cleaned in the manner specified by the manufacturer. Otherwise, it is the manufacturer’s legal responsibility to reimburse a customer if damage occurs when the garment is cleaned according to its instructions. Low labeling therefore discourages customers and professional cleaners from using alternative process options (Blackler et al., 1995).

In 1994 and 1995 the FTC requested public comment on the Care Labeling Rule in an effort to begin revisions that would remove barriers to the use of alternative clothes cleaning process options. The FTC is now in the process of collecting additional information for revision of this rule (Vecellio, 1996). USEPA is also working with fabricare stakeholders, including clothing and textile manufacturers, to develop a more accurate care labeling system that does not discriminate among cleaning methods.

8.8 OTHER APPLICABLE REGULATIONS

There are numerous regional, state, and local health, safety, and environmental regulations that may affect the fabricare industry in the U.S. As mentioned previously, many federal regulations are enforced more strictly by designated state agencies.

As an example, the State of Oregon established a waste minimization and hazardous waste management program designed to eliminate future drycleaning solvent releases to the environment. This program was established in response to the following concerns:

- The drycleaning industry feared that individual drycleaners would go out of business as a result of the liability associated with Oregon’s cleanup law. This law would have required business and property owners to pay for the cleanup of contamination on or around their premises.
- Property owners faced considerable difficulty in obtaining loans from lending institutions if a fabricare operation was co-located or adjacent to their property.
- Drycleaners were finding it increasingly difficult to obtain and renew leases.

The law established an exemption for drycleaners from paying environmental clean-up costs and damages as a result of solvent contamination, set up a program in which all drycleaners paid annual fees to be used to clean up contaminated sites, and required individual operations to establish equipment and waste management practices to prevent future contamination of the environment. Faced with uncertainties and potentially damaging liabilities, drycleaning organizations have successfully promoted the passage of

similar legislation in seven other states, with legislation pending in four states¹¹ (Gottlieb et al., 1997; ODEQ, 1997). Exhibits 8-5 and 8-6 contain information regarding state fees and other provisions for reduced liability exposures, respectively.

In addition, cities and municipalities have enacted numerous zoning restrictions that may affect all types of fabricare operations. For example, the City of Beverly Hills, California, has passed restrictions on drycleaning operations that specify noise and odor requirements, allowable cleaning capacities, numbers of machines per operation, location of equipment in buildings, and required approval of building inspectors and the fire department prior to equipment installation and/or modification. In addition, many localities have adopted some or all of the National Fire Protection Association's standards for drycleaning equipment and operations (NFPA-32), as noted below (CBH, 1997).

The National Fire Protection Association (NFPA) is a national consensus-building organization that has established fire protection safety standards. Although all NFPA standards are considered voluntary, many localities and state agencies have adopted them into law. Owners of drycleaning operations should consult with their local fire marshal about the applicability of NFPA-32 standards. In 1996 the NFPA passed safety standards (NFPA-32) for drycleaning plants classified in the following solvent categories:

- Type I - systems employing solvents with a flashpoint of less than 100°F (37.8°C);
- Type II - systems employing solvents with a flashpoint between 100°F and 140°F (38°C and 60°C), such as Stoddard solvent;
- Type IIIA - systems employing solvents with a flashpoint of 140°F (60°C) and above, such as 140°F solvent and DF-2000;
- Type IIIB - systems employing liquids with a flashpoint at or above 200°F (93.4°C) and complying with building requirements (ventilation, fireproofing, and electrical equipment) of Chapter 3 of the regulation;
- Type IV - systems employing nonflammable liquids (PCE) and complying with building requirements (ventilation and electrical equipment) of Chapter 4 of the regulation;
- Type V - systems employing nonflammable solvents (PCE) and complying with building requirements (ventilation and electrical equipment) of Chapter 5 of the regulation.

¹¹States with current liability-limiting legislation pertaining to drycleaners include Connecticut, Florida, Kansas, Minnesota, Oregon, South Carolina, and Tennessee. Legislation is pending in Illinois, New Jersey, North Carolina, and Pennsylvania. Arizona does have cleanup and reduced liability legislation, but there is no specific reference to the drycleaning industry. Similar legislation was introduced to the California legislature in 1995 (Assembly Bill 1096), but was subsequently withdrawn with no current plans of reintroduction (Gottlieb et al., 1997).

Exhibit 8-5. State Fees for Reduced Liability Exposures

State	Annual Fee ^a	PCE Tax	Gross Receipt Tax	Equivalent Cost Per Garment
Connecticut	NA	NA	1%	\$0.054
Florida	\$100	\$5.00/gallon	2%	\$0.124
Kansas	NA	\$3.75/gallon ^b	2%	\$0.116
Minnesota	\$1,000	\$3.50/gallon	NA	\$0.028
North Carolina	\$2,500 ^c	\$4.25/gallon	NA	\$0.061
Oregon	\$1,500 ^d	103% of sale	NA	NA
South Carolina	\$1,500	\$10.00/gallon	NA	\$0.052
Tennessee	\$1,000	\$10.00/gallon	NA	\$0.041

Source: Gottlieb et al., 1997

NA Category not applicable to individual state.

^a For facilities with approximately nine employees (or no cost difference for size was indicated).

^b This tax will be raised by \$0.25 each year until the fee reaches \$5.50/gallon.

^c Cost can be lowered to \$500 if financial responsibility is demonstrated by obtaining pollution and remediation legal liability insurance with coverage of not less than \$1 million or deposit with the Commission securities or a third-party bond for securing for pollution and liability for \$1 million.

^d Fee is lowered to \$1,000 if annual sales are less than \$50,000.

The NFPA is currently in the process of revising this standard in order to reflect updated equipment, alternative HC solvents, and the newer fabricare technologies that are currently being developed. The NFPA expects the revised standards to be performance-based, rather than focusing on specific technology. This revision is slated for completion by mid-1999 (Spencer, 1998).

Exhibit 8-6. State Legislative Provisions for Reduced Liability

State	Deductible^a	Maximum Paid/Year	Site Investigation	Remediation and/or Treatment	Monitoring
Connecticut	\$10,000 if reported prior to 1990; \$20,000 if after 1990	\$50,000	X		
Florida	Up to 6/30/97 - \$1,000 7/1/97 to 6/30/01 - \$5,000 7/1/01 to 12/31/05 - \$10,000 After 2005 - fund pays \$0		X	X	X
Kansas	\$2,500	Up to 7/1/95 - \$100,000; After 7/1/95 - 10% of fund's income for previous fiscal year	X	X	X
Minnesota	\$10,000	20% of account balance at beginning of fiscal year	X		
North Carolina	\$10,000	\$200,000; or \$400,000 if substantial threat to human health or the environment	X	X	X
Oregon	\$10,000			X	
South Carolina	Prior to 10/1/97 - \$1,000 10/1/98 - \$5,000 10/1/99 - \$10,000 10/1/00 - \$15,000 10/1/01 - \$20,000 After 2001 - \$25,000		X	X	X
Tennessee	10% with a max. of \$10,000	\$200,000	X	X	

Source: Gottlieb et al., 1997

^a For facilities with approximately nine employees.

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